

IS 10322 (Part 5/Sec 5) : 2013

भारतीय मानक

(Reaffirmed 2018)

प्रदीपक

भाग 5 विवरणात्मक अपेक्षाएँ

अनुभाग 5 फ्लड लाइटिंग

(पहला पुनरीक्षण)

Indian Standard

LUMINAIRES

PART 5 PARTICULAR REQUIREMENTS

SECTION 5 FLOODLIGHTS

(*First Revision*)

ICS 29.140.40

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BUREAU OF INDIAN STANDARDS

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Price Group 3

FOREWORD

This Indian Standard (Part 5/Sec 5) (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Illumination Engineering and Luminaires Sectional Committee had been approved by the Electrotechnical Division Council.

This standard was first published in 1987. This revision has been undertaken primarily to align the existing standard with the latest International Standard.

This standard covers the requirements of floodlights. This standard covers the safety and photometric requirements.

This standard (Part 5/Sec 5) is one among the series of Indian Standards which deals with luminaries. The other part and sections are as follows :

Part 1	General requirements
Part 5	Particular requirements
(Part 5/Sec 1)	General purpose luminaires
(Part 5/Sec 2)	Recessed luminaires
(Part 5/Sec 3)	Luminaires for road and street lighting
(Part 5/Sec 4)	Portable general purpose luminaires
(Part 5/Sec 6)	Handlamps
(Part 5/Sec 7)	Lighting chains
(Part 5/Sec 8)	Luminaires for emergency lighting

This standard is to be read in conjunction with IS 10322 (Part 1) : 2010 'Luminaires: Part 1 General requirements and tests'. For the sake of convenience, the clauses of this standard correspond to those of IS 10322 (Part 1): 1982 'General requirement', instead of reproducing full text of each clause; reference to relevant clauses of IS 10322 (Part 1) has been given.

This standard is based on IEC 60598-2-5 (1998) 'Luminaires — Part 2: Particular requirements, Sec 5 Flood lights' issued by the International Electrotechnical Commission (IEC) except for the following deviations:

Photometric requirements have been incorporated

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

*Indian Standard***LUMINAIRES****PART 5 PARTICULAR REQUIREMENTS****SECTION 5 FLOODLIGHTS***(First Revision)***1 SCOPE**

This standard (Part 5/Sec 5) specifies requirements for floodlights for use with tungsten filament, tubular fluorescent LED, LED modules and other discharge lamps on supply voltages not exceeding 1 000 V.

It is to be read in conjunction with those sections of IS10322 (Part 1) to which reference is made.

2 REFERENCES

The following Indian Standards are necessary adjunct to this standard.

<i>IS No.</i>	<i>Title</i>
10322 (Part 1) : 2013	Luminaires: Part 1 General requirements and tests
13383 (Part 3) : 1992	Methods of photometry of luminaires: Part 3 For floodlighting

3 TERMINOLOGY

For the purpose of this standard, the definitions given in IS 10322 (Part 1/Sec 1) and the following shall apply.

3.1 Floodlighting — Lighting by projection of the whole of a scene or subject to an illuminance significantly greater than that of its surroundings.

NOTE — The difference in illumination between the subject and its surroundings may, alternatively, be achieved by colour.

3.2 Floodlight — Luminaire for floodlighting.

NOTE — A floodlight may be for either exterior or interior use or for both.

4 GENERAL TEST REQUIREMENTS

The provisions of IS 10322 (Part 1/Sec 0) apply. The tests described in each appropriate Section of IS 10322 (Part 1) shall be carried out in the order listed in this standard.

5 CLASSIFICATION OF LUMINAIRES

Floodlights shall be classified in accordance with the provisions of IS 10322 (Part 1/Sec 2).

6 MARKING

6.1 The provisions of IS 10322 (Part 1/Sec 3) shall apply.

Where necessary, to ensure proper use and maintenance, the following additional particulars shall also be marked on the floodlight or otherwise made available to the purchaser.

- Operating position, if not universal;
- Weight and overall dimensions of the floodlight;
- Maximum projected area of the floodlight;
- Range of mounting heights; and
- Suitability for use indoors.

6.2 BIS Certification Marking

The luminaires may also be marked with the Standard Mark.

6.2.1 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

7 CONSTRUCTION

The provisions of IS 10322 (Part 1/Sec 4) shall apply together with the requirements of **7.1** to **7.8**.

7.1 Floodlights for use outdoors shall have protection against the ingress of moisture at least equivalent to IPX3.

7.2 Lampholder brackets and lamp supports where used shall withstand normal usage throughout the life of the floodlight. They shall accept and retain lamps which are within the dimensional tolerances stated in the appropriate Indian Standards where applicable, and locate the lamp or lamps in the designed relationship to the optical control devices in the floodlight.

7.3 When provision is made for alternative sizes of lamps or light centre positions, the adjusting means shall be positive and firmly retained in the selected position.

7.4 Refractors, reflectors or any other light controlling components shall be so marked or constructed that they can be fitted or replaced only in the correct relationship to the light source.

7.5 The means for attaching the floodlight to its support shall be appropriate to the weight of the floodlight.

For floodlights for use above ground level outdoors, the connection shall withstand wind speeds of 150 km/h on the projected surface of the floodlight assembly without undue deflection.

Fixings which carry the weight of the floodlight and internal accessories shall be provided with appropriate means to prevent the dislodgement of any part of the floodlight by vibration, either in service or during maintenance.

Parts of floodlights for mounting heights 3 m or higher which are fixed other than with at least two devices, for example, screws or equivalent means of sufficient strength, shall have such extra protection as to prevent those parts falling and endangering persons, animals and surroundings, if a fixing device fails under normal conditions. The points of attachment which allow the floodlight to rotate and which are tested below are excluded from the requirements of this standard.

Compliance shall be checked by inspection and, for floodlights for use above ground level outdoors, by the following additional test:

The floodlight is mounted with its largest projected area as viewed in elevation lying in the horizontal plane, and with the means of attachment secured in accordance with the manufacturer's recommendations.

For floodlights for use above ground level outdoors, a constant evenly distributed load is applied for 10 min on the floodlight using sand bags providing 2.4 kN/m² of floodlight projected area. The floodlight is then turned 180° in the vertical plane, about the point of attachment, and the test is repeated.

During the test there shall be no failure or movement about the point of attachment and after either part of this test there shall be no permanent set exceeding 1°.

7.6 Where means for angular adjustment are provided, there shall be provision for positive locking after any such adjustments have been effected.

7.7 Floodlights for use outdoors shall be resistant to the vibrations which may occur during normal use.

7.8 Glass covers shall either consist of a glass that

fractures into small pieces, or shall be provided with a guard of sufficiently small mesh or the use of a film-coated glass that retains glass fragments.

For flat glass covers compliance is checked by inspection, and if the glass is not provided with a guard by the following test:

The glass component is supported over the whole area to ensure that particles shall not be scattered upon fragmentation and that movement of the particles is prevented. Shatter the glass with a centre punch at a point 30 mm from the mid-point of one of the longer edges of glass towards the centre. Within 5 min of fracture count the particles in a square of 50 mm side located approximately at the centre of the area of coarsest fracture but always within the confines of the glass.

A glass is deemed to have passed the test, if the number of particles in the square of 50 mm side is more than 60; glass splinters and pieces less than the full thickness of the glass are excluded from the count. For glasses of small size where a 50 × 50 area is not possible, the number of pieces necessary in the count is proportionately reduced.

A suitable method of counting the particles is to place a square of 50 mm side, of transparent material, over the glass and mark a spot of ink as each particle within the square is counted. For the count at the edge of the square, select any two adjacent sides of the square and count all the particles intersected by these; exclude all other intersected particles.

NOTES

1 Where possible, the area of measurement should not be within 30 mm of any edge, hole or machining of the glass.

2 In the count of the total number of particles in the square of 50 mm side, the particles in the centre of the square plus those at the edge are taken into account. For counting purposes of particles at the edge of the square, it is recommended that all pieces intersected by two adjacent sides be included and all particles intersected by the two other sides be ignored (*see* Fig. 1).

3 For glass covers formed from a flat plate, a test is under consideration.

8 CREEPAGE DISTANCES AND CLEARANCES

The provisions of IS 10322 (Part 1/Sec 11) shall apply.

9 PROVISION FOR EARTHING

The provisions of IS 10322 (Part 1/Sec 7) shall apply.

10 TERMINALS

The provisions of IS 10322 (Part 1/Sec 14 and Sec 15) shall apply.

11 EXTERNAL AND INTERNAL WIRING

The provisions of IS 10322 (Part 1/Sec 5) shall apply.

12 PROTECTION AGAINST ELECTRIC SHOCK

The provisions of IS 10322 (Part 1/Sec 8) shall apply.

13 ENDURANCE TESTS AND THERMAL TESTS

13.1 Luminaires with an IP classification greater than IP20 shall be subjected to the relevant tests of **12.4**, **12.5** and **12.6** of IS 10322 (Part 1/Sec 12) after the test(s) of **9.2** but before the test(s) of **9.3** of IS 10322 (Part 1/Sec 9) specified in **14**. The provisions of IS 10322 (Part 1/Sec 12) shall apply, but with the following modification.

13.1.1 When applying the limits in the Tables 12.1 to 12.6 of IS 10322 (Part 1/Sec 12) to floodlights for use outdoors, 10°C shall be deducted from the temperatures measured on the floodlight in the test enclosure to allow for the effects of natural air movement which occur in the working environment of the floodlight.

14 RESISTANCE TO DUST AND MOISTURE

The provisions of IS 10322 (Part 1/Sec 9) shall apply. For luminaires with an IP classification greater than IP20, the order of the tests specified in IS 10322 (Part 1/Sec 9) shall be as specified in **13** of IS 10322 (Part 1/Sec 9).

15 INSULATION RESISTANCE AND ELECTRIC STRENGTH

The provisions of IS 10322 (Part 1/Sec 10) shall apply.

16 RESISTANCE TO HEAT, FIRE AND TRACKING

The provisions of corresponding Indian Standard shall apply.

17 PHOTOMETRIC REQUIREMENTS

17.1 The manufacturer or supplier shall provide the following data relating to performance of the luminaires:

- Luminous intensity curves for both vertical and horizontal planes;
- Beam spread on the basis of $I > 0.5 I_{\max}$ and $I > 0.1 I_{\max}$ for both vertical and horizontal planes;
- Maximum intensity; and
- Total light output ratio.

17.1.1 The manufacturer or supplier shall provide the following data relating to performance of the luminaire on request:

- Relative isolux diagram for at least '0°' aiming angle;
- Relative iso-candela diagram; and
- Data on zonal flux.

17.2 Light Controlling Components

The attachment of reflectors or any other light controlling components shall be such that they can only be fitted or replaced in the correct relationship to their light source.

17.3 Photometric Test

The photometric performance shall be determined by the test method given in IS 13383 (Part 3).

A recommended photometric test for floodlights fitted with tungsten filament lamps is given in Annex A.

Floodlights fitted with tungsten filament lamps shall meet the photometric requirements specified in **17.1**.

ANNEX A

(Clause 17.3)

PHOTOMETRIC TEST FOR FLOODLIGHTS**A-1 GENERAL**

A-1.1 The photometric measurement described in this standard relate to determining the luminous intensities in the projected beam which may be presented as a luminous intensity distribution diagram, iso-candela diagram or in tabulated form suitable for use in computer calculation. These intensities are deduced from illuminance measurement.

A-1.2 Half Peak Side Angle

The angle between the direction of maximum luminous

intensity and the direction in which the floodlight has a luminous intensity of 50 percent of the maximum measured in the specific half plane.

A-1.2.1 Inner Beam of Floodlight

The solid angle containing all directions of luminous intensities greater than or equal to 50 percent of maximum intensity.

A-1.2.2 Outer Beam of Floodlight

The solid angle containing all directions of luminous

intensities greater than or equal to 10 percent of maximum intensity.

A-1.2.3 Light Output Ratio

Ratio of the light output of a floodlight, measured under specified practical conditions, to the sum of the individual light output of the lamps operating outside the floodlight under specified conditions.

A-2 EQUIPMENT

A-2.1 Photometric Equipment

The photometric equipment shall be calibrated throughout metric equipment the entire usable scale and the individual readings shall be reproducible within a tolerance of ± 2 percent.

A-2.1.1 Provision should be made for correct optical positioning of floodlights in relation to the photometric axis and for candle-power measurements at any angular setting in both horizontal and vertical directions. Stray light should be entirely avoided in the test set up.

A-2.2 Photometric Integrator

To average out minor variations in the beam, an integrating device should be used which will integrate the illumination over one square degree (53.19×53.19 cm for 30 m testing range) over a circular area of 53.19 cm diameter at a distance of 30 m.

A-3 PROCEDURE

A-3.1 Test Distance

A minimum range of 30 m is required.

A-3.2 Mounting

The floodlight shall be mounted on a goniometer to allow positioning to definite angles about both horizontal and vertical axes. The centre of the aperture shall be at the intersection of the horizontal and vertical axis.

A-3.3 Test Procedure

A-3.3.1 The floodlight shall be adjusted in ten equal angular steps in each of ten equally spaced vertical or horizontal planes (*see* Fig. 1). The spacing should be planned so that the maximum beam candle-power is approximately centered and so far that 10 percent of the maximum is just within the area covered. This method of taking candle-power is to traverse the beam

with such angular spacing so as to give approximately 100 reading points uniformly spaced throughout the beam, as per the beam limit given. By interpolating between these readings a candle-power distribution diagram shall be plotted on rectangular coordinates.

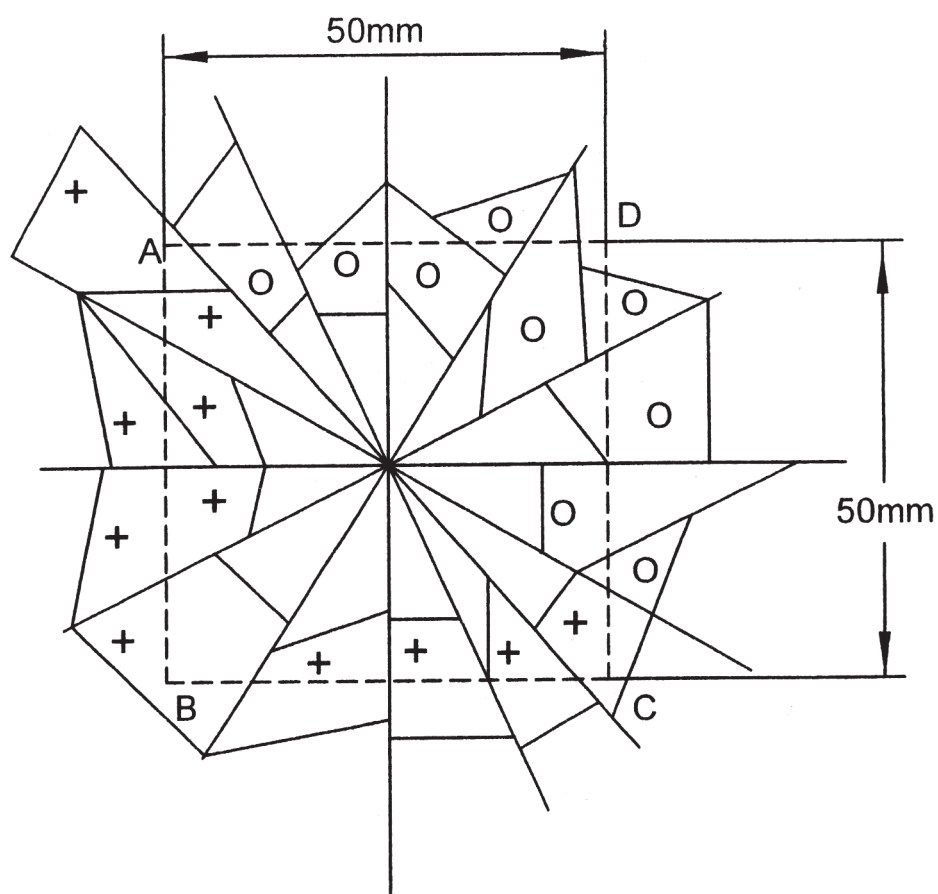
A-3.3.2 The relative candle-power readings of the test lamp alone and of the test lamp and floodlight combination should be made with the test lamp operating under identical electrical conditions in both tests. The average candle-power of the test lamp shall be measured at each angular setting by rotating the lamp or by taking the average candle-power values in not less than ten planes spaced equally around the lamp alone is obtained by the usual summation process using zonal lumen constants. All candle-power readings should be corrected in proportion to the rated lumens of the test lamp by multiplying by the ratio of rated lamp lumens to relative lamp lumens.

A-3.3.3 If required, for measurement of stray light, the outside of the beam may also be divided into suitable rectangular areas of larger dimensions than the spacing with the beam.

A-4 EVALUATION OF TEST RESULTS

A-4.1 The evaluation of test results shall be done in the following order:

- a) Average the corresponding candle-power values in the right and left sides of the beam;
- b) Plot the change of candle-power across each of the horizontal traverses in the beam and work out from this data the iso-candela and beam limit curves;
- c) Compute the lumens in each individual test area or rectangle using the proper lumen constants;
- d) Sum up the lumens of each individual test area making suitable allowance where a test area lies partially within the beam and partially within the stray light zone;
- e) Compute the stray light, if required;
- f) Compute the beam factor of the floodlight by dividing beam flux by manufacturers' rated lumen output of the test lamp; and
- g) Compute the overall efficiency, if required, by dividing total lumen output (sum of beam flux and stray light lumens) by manufacturers' rated lumen output of the test lamp.



- + Particles counted (intersected by two selected adjacent sides: AB/BC)
O Particles not counted (not intersected by two selected adjacent sides: AB/BC)

FIG. 1 COUNTING PARTICLES AT THE EDGE OF THE SQUARE

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